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Analysis of the optical emission of the young precataclysmic variables HS 1857+5144 and ABELL 65

Shimansky V., Pozdnyakova S., Borisov N., Bikmaev I., Vlasyuk V., Spiridonova O., Galeev A., Mel'nikov S.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

We analyze the physical state and the properties of the close binary systems HS 1857+5144 and Abell 65. We took the spectra of both systems over a wide range of orbital phases with the 6-m telescope of the Special Astrophysical Observatory of the Russian Academy of Sciences (SAO RAS) and obtained their multicolor light curves with the RTT150 and Zeiss-1000 telescopes of the SAO RAS. We demonstrate that both Abell 65 and HS 1857+5144 are young precataclysmic variables (PV) with orbital periods of Porb = 1.d003729 and Porb = 0. d26633331, respectively. The observed brightness and spectral variations during the orbital period are due to the radiation of the cold component, which absorbs the short-wave radiation of the hot component and reemits it in the visual part of the spectrum. A joint analysis of the brightness and radial velocity curves allowed us to find the possible and optimum sets of their fundamental parameters. We found the luminosity excesses of the secondary components of HS 1857+5144 and Abell 65 with respect to the corresponding Main Sequence stars to be typical for such objects. The excess luminosities of the secondary components of all young PVs are indicative of their faster relaxation rate towards the quiescent state compared to the rates estimated in earlier studies. © 2009 Pleiades Publishing, Ltd.

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